technical solution having small overall dimensions and enabling a complete integration of said regulation device (protection against collisions), though assuring a reliable sealing.

The invention is obviously not limited to the embodiments described and shown in the attached drawings. Changes are still possible, in particular as far as the constitution of the various elements is concerned or by replacing with technical equivalents, though without leaving the protection field of the invention.

CLAIMS

add B'

1. Device for regulating the flow of a fluid, in particular a gas, in at least a duct portion, an intake passage or similar by means of a valve or of a similar rotating obstruction element, supported by a control shaft, characterized in that each assembly valve (3)/control shaft (4) is integrated into the structure of the duct portion (2) concerned or into the structure of piece (1) comprising at least a duct portion (2), on a through opening, being rotatably supported between two complementary parts (2', 2" or 1", 1"') forming by assembly, by friction or vibration welding said duct portion (2) or said piece (1) and being mounted in corresponding housing recesses

(5, 5') obtained in the walls of the duct portions (2) and/or in one or more corresponding separated or displaced bearings (6) which are present on at least one of parts (1", 1"') forming piece (1).

2. Device according to claim 1, characterized in that the support of the control shaft (4) and its rotation guiding are assured, at least partly, by at least a bearing (6) placed outside the wall or wall of duct portion(s) (2) or of piece (1) concerned, formed if necessary by assembling the two complementary parts.

3. Device according to claim 2, characterized in that the control shaft (4) is mounted rotatably on one or more bearings (6) displaced with respect to the walls of the duct(s) (2) and formed on one (1") of the two parts (1", 1"') of piece (1), said shaft (4) being fixed and positioned by blocking it elastically onto said bearings (6, 12) and said shaft (4) being blocked between said parts (1", 1"') without any contact with the other one (1"') of said two parts (1", 1"').

4. Device according to any of the claims 1 and 2, characterized in that the control shaft (4) is "sandwiched" between the parts (2', 2") constituting said at least one duct portion (2) or said piece (1),

on the assembly and connection area of said parts (2', 2" or 1", 1"').

5. Device according to any of the claims 1, 2 and 4, characterized in that at least one of the supporting and rotation guiding bearings (7) of the control shaft (4) is obtained by cooperation of the opposite housing recesses (5, 5') in the connection areas of the walls of the two parts (2', 2" or 1", 1"') forming the duct portion(s) (2) or the piece (1), said supporting and guiding bearing(s) (7) being possibly sealed with or without interposition of an attached sealing element (8).

6. Device according to any of the claims 2 to 5, characterized in that the control shaft (4) comprises one or more cylinder-shaped protuberances (9) or ring-shaped protuberances (9') obtained as one piece with said shaft (4) or attached onto the latter by over-welding or mounting and cooperating with the supporting and guiding bearings (6, 7) or with translation blocking stops (10) of said control shaft (4).

7. Device according to any of the claims 1 to 6, characterized in that the control shaft (4) comprises one or more pre-mounted rotation guiding bearings (11), blocked within supporting bearings (12) formed during the assembly of the two parts (2' and

2" or 1" and 1"') constituting the duct portion(s) (2) or the piece (1).

8. Device according to any of the claims 1 to 7, characterized in that the two parts (2' and 2" or 1" and 1"') constituting the duct portion (2) and/or the piece (1) are made of thermoplastic material, the opening for the shatf (4) being sealed by forming a gasket during assembly by vibration welding, by means of a separate sealing element attached before or after assembly or by attaching an additional part (17) by vibration welding onto the outer surface of the passage concerned, said additional part being able, if necessary, to house an axially sealed supporting and guiding bearing (6, 12).

9. Device according to any of the claims 1 to 8, characterized in that it comprises an assembly valves (3)/shaft (4) extending to several duct portions (2) or through openings of piece (1), each comprising a valve (3), all said valves (3) being mounted or formed onto a unique control shaft (4).

10. Intake manifold comprising at least one, and preferably a plurality of intake pipes in the form of duct portions connecting the chamber of the manifold with the heads, and obtained by assembling at least two complementary parts made of thermoplas-

tic material by vibration welding, characterized in that at least some of the pipes (2) or through openings of the latter, and preferably all of them, comprise a regulation device according to any of the claims 1 to 9, forming an assembly for flow regulation comprising a plurality of valves (3) mounted or formed onto a unique control shaft (4) passing through said intake pipes (2) or through openings and provided on one of its ends with an interconnecting element (13), in particular at least a rotation coupling element, with a transmission means (14) connected with an actuator (14') or directly equipped with an actuator.

11. Intake manifold according to claim 10, characterized in that the control shaft (4) provided with valves (3) extends transversally near one of the ends of the intake pipes (2), i.e. as far as its connection area with wall (1') of the chamber of manifold (1) or as far as its connection area with the fixing plate on the heads, the supporting bearings (12) and, if necessary, the guiding bearings (6, 7), as well as the translation blocking stops (10) of the control shaft (4) being at least partially, and preferably completely, formed onto said wall (1') of the chamber of manifold (1) or onto said fixing plate.

12. Intake manifold according to claim 11, characterized in that the control shaft (4) freely goes through the walls of the intake pipes (2) concerned without contact or extends through the openings of said pipes (2) getting into the chamber of manifold (1), the assembly of the structural parts (1", 1"') of manifold (1) creating a sealed case (15) around the connection areas of the assembly of said intake pipes (2) together with wall (1') of manifold (1) or where said pipes (2) get into the chamber of manifold (1), the piece formed by the assembly control shaft (4)/valves (3) being mounted by introduction into bearings (6, 12) pre-formed onto wall (1') of one (1") of the pieces (1", 1"') forming manifold (1), on cylinder-shaped protuberances 9 or on bearing portions (11) formed or attached onto the shaft (4), the other one (1"') of said pieces (1", 1"') possibly preventing the coming out of the shaft (4) from said bearings (6, 12) after assembling the two pieces (1" and 1"').

13. Intake manifold according to claim 12, characterized in that said sealed case (15) is completed on opening (15') for the portion of the control shaft (4) getting out and supporting the interconnecting element (13) or for the re-entrant han-

dling bar (14") of the transmission means (14), by means of a ring-shaped shaft plug (16) shrink-fitted or tight-fitted or welded onto said passage (15').

14. Intake manifold according to claim 12, characterized in that the sealed case (15) formed by assembling the two parts (1" and 1"') of manifold (1) is closed on the opening (15') by the portion of the control shaft (4) getting out and supporting the interconnecting element (13) or by the re-entrant handling bar (14") of the transmission means (14), by interconnection, by vibration welding, on the opening or on the outer surface of said passage (15'), by means of a third hollow part (17) closing at least a component of the transmission means (14) and/or at least an axially sealed bearing (6, 12).

15. Intake manifold according to any of the claims 13 and 14, characterized in that the assembly shaft (4)/valves (3) fully extends within the sealed case (15), said shaft (4) not going across the welding assembly areas or lines, the two valves (3) at the opposite ends of the shaft (4) being mounted protrudingly and the valve (3) positioned near passage (15)' being provided with an axial blind channel (18), for instance with rectangular section, housing the end of handling bar (14") inserted within.

16. Method to produce an intake manifold according to any of the claims 10 to 15, starting from at least two parts made of thermoplastic material, characterized in that it consists in providing a first part (1") of an intake manifold (1), in installing on or within said first part and within recesses (5, 5') and/or portions of suitable supporting or guiding bearings (6, 12), a control shaft (4) comprising a plurality of valves (3) arranged each within a through opening or a part passage (2') of corresponding intake pipe (2), in providing at least a second part (1"') of the intake manifold (1) comprising, if necessary, the complementary parts (2") of intake pipes (2) and in arranging it or them in assembling position with the first part (1") blocking or "sandwiching" the control shaft (4) with valves (3), and finally in assembling by vibration welding said at least two parts (1", 1"') of intake manifold (1).

17. Method according to claim 16, characterized in that the mounting of the assembly shaft (4)/valves (3) is carried out by fitting onto said first part (1") and in that the assembly of the two parts (1" and 1"') results in a sealed case (15) around said assembly except for a drawing passage (15'), the lat-

ter being sealed when coupling the transmission means (14) with the control shaft (4).